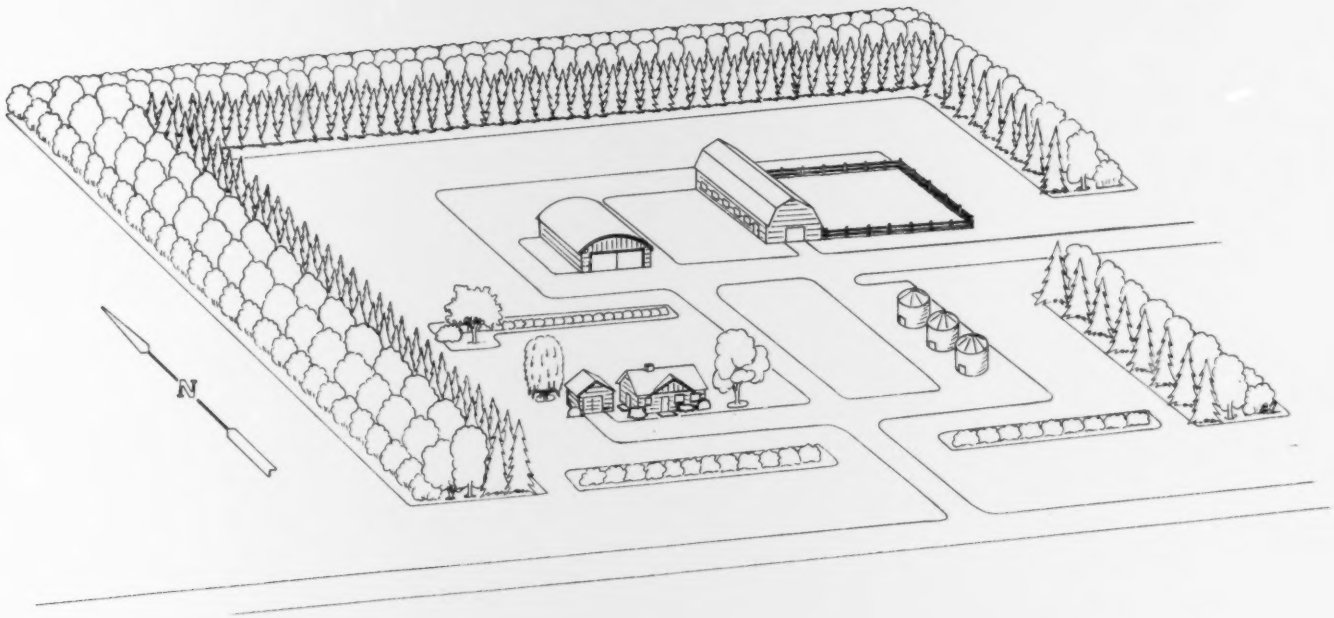
PFRA

Prairie Farm Rehabilitation Administration

# Planning Farm Shelterbelts




Canada

## Introduction

Properly planned shelterbelts provide many benefits to farm families. They reduce wind, control blowing snow, protect livestock, buildings and gardens, and trap snow for dugouts. Shelterbelts also provide habitat for wildlife and beautify the farmyard.

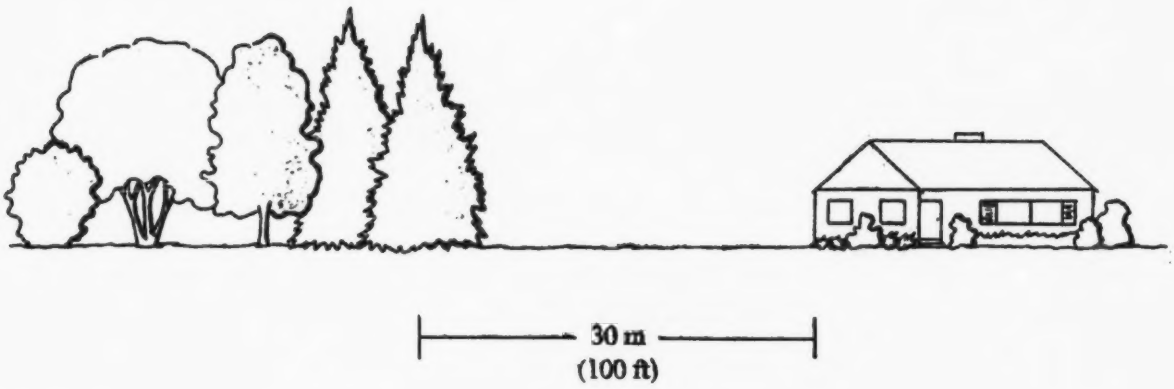
## Planning Your Shelterbelt

Proper planning of a shelterbelt involves reviewing your present requirements, assessing your future needs, estimating the quality of existing shelterbelts and planning new shelterbelts for unprotected areas of the farm.

Begin by mapping out your farm using a scale of 2.5 centimetres = 30 metres or 1 inch = 100 feet, marking locations of existing trees, sloughs, buildings, farm access roads and power lines. Next, draw in the prevailing wind directions and note areas where excessive snow accumulation can cause problems.

To eliminate problems with snow buildup, keep all trees at least 30 metres (100 ft) from main buildings and driveways. Mark this distance around the perimeter of the yard plan to indicate the proposed locations of the shelterbelts (Figure 1).

**Minimum Distance From Buildings**



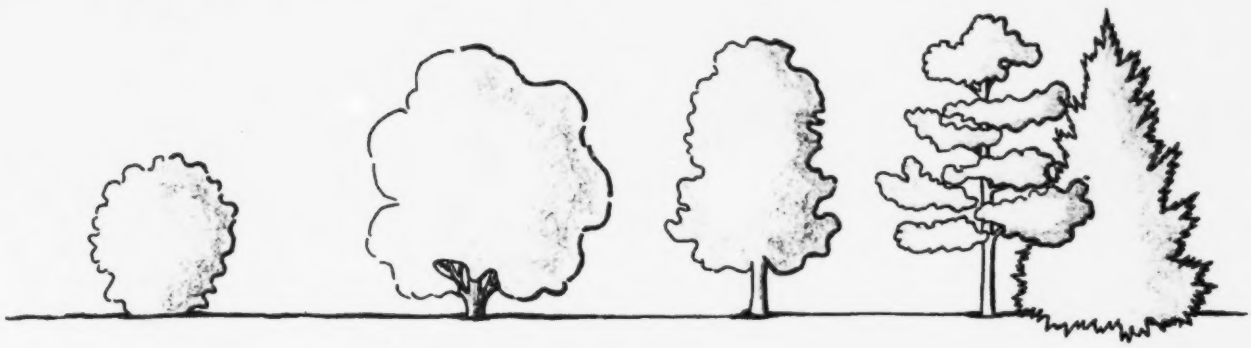

(Figure 1)

## Shelterbelt Design

Once you have determined the location, decide on the number of shelterbelt rows required to properly protect the farm. Up to five rows of trees are recommended on the north and west sides to provide protection from prevailing prairie winds. Two or three rows are usually adequate on the east and south side. Field access roads should be located in the east or south corners to allow summer air flow through the yard.

The farmstead shelterbelt should be tall, fast-growing, long-lived and dense in both summer and winter. Accomplish this by using a variety of species, each possessing at least one of the desired characteristics. Refer to the brochure entitled "Shelterbelt Species" for a description of trees and shrubs used for shelterbelts.

The outside row of a shelterbelt acts as a snow trap and should be a dense shrub such as caragana, villosa lilac, or choke cherry. The second row should be a fast-growing species such as acute willow or Manitoba maple. Long-lived species such as green ash or Manitoba maple should be planted in the third row. The fourth and fifth rows, which are closest to the yard, should be tall, dense and long-lived. Conifers such as Colorado spruce, white spruce and Scots pine are suitable here. In addition, they benefit from the early protection provided by the outer rows (Figure 2).



| 1 | 2 | 3 | 4 - 5 |
|---|---|---|---|
| Caragana | Willow | Ash | Colorado spruce |
| Choke cherry | Maple | Maple | White spruce |
| Villosa lilac | | | Scots pine |

(Figure 2. Side View of a 5-row shelterbelt.)

Poplar and Siberian elm are fast-growing but short-lived on the prairies. If they are used in the shelterbelt, plant them outside the shrub row to provide early protection for the slower growing species and to facilitate removal of dead trees.

Although five tree rows are recommended for effective shelter, not all sites have sufficient room for this many rows. For confined sites, reduce the number of rows rather than planting too close to buildings or reducing the recommended spacing between the rows (Figure 3). If you are limited to two rows, plant one row of dense shrubs such as caragana, villosa lilac, or choke cherry, and one row of dense trees such as spruce.

## Table 1
## SPECIES RECOMMENDED FOR SHELTERBELTS

| SPECIES | MATURE SIZE HEIGHT m | (ft) | WIDTH m | (ft) | LIFE SPAN | MOISTURE REQUIREMENTS | GROWTH RATE | SALT TOLERANCE | COMMENTS |
|---|---|---|---|---|---|---|---|---|---|
| Caragana | 4.5 | (15) | 3.0 | (10) | 80 | Low | Moderate | Medium | Avoid planting in poorly drained sites |
| Villosa lilac | 4.0 | (13) | 2.5 | (8) | 60 | Medium | Moderate | Medium | Non-suckering, performs poorly on sandy soils |
| Choke cherry | 7.0 | (22) | 3.5 | (12) | 40 | Medium | Moderate | Medium-Low | Shade intolerant |
| Buffaloberry | 4.5 | (15) | 3.5 | (12) | 40 | Low | Moderate | High | Silvery foliage, edible red fruit, spines, suckers |
| Sea-buckthorn | 4.5 | (15) | 3.5 | (12) | 40 | Low | Moderate | High | Silvery foliage, edible orange fruit, spines, suckers |
| Acute willow | 15.0 | (50) | 15.0 | (50) | 60 | High | Fast | Low | Long, narrow foliage |
| Siberian elm | 12.0 | (40) | 12.0 | (40) | 10-25 | Low | Fast | Medium | Heavy seed production |
| Walker poplar | 18.0 | (60) | 3.0 | (10) | 10-25 | High | Fast | Low | Female clone, produces seed cotton |
| Assiniboine poplar | 18.0 | (60) | 6.0 | (20) | 10-20 | High | Fast | Low | Male clone, resistant to insects & disease |
| Manitou poplar | 18.0 | (60) | 11.0 | (36) | 10-25 | High | Fast | Low | Male clone, resistant to insects & disease |
| Green ash | 15.0 | (50) | 9.0 | (30) | 60 | Medium | Moderate | Medium | Slow growth under dry conditions |
| Manitoba maple | 14.0 | (45) | 12.0 | (40) | 45 | Medium | Fast | Medium | Susceptible to aphids |
| Colorado spruce | 18.0 | (60) | 5.0 | (18) | 80 | Medium | Slow | Medium-Low | Requires protection during establishment |
| White spruce | 18.0 | (60) | 5.0 | (18) | 70 | Medium | Slow | Low | Requires protection during establishment |
| Scots pine | 18.0 | (60) | 5.0 | (18) | 70 | Medium | Moderate | Low | Faster growth rate than spruce, requires protection during establishment |

For more detailed description of tree species, refer to the "Shelterbelt Species" brochure.

**NOTE:** The root systems of some species, including willow, Siberian elm, maple and poplar, are very fibrous and competitive. These species should not be planted next to gardens or orchards.

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## Species Selection

Selection of appropriate tree and shrub species is very important. Each species has its own characteristic height, width, density, longevity, growth rate and resistance to insects and diseases (Table 1).

## Shelterbelt Spacing

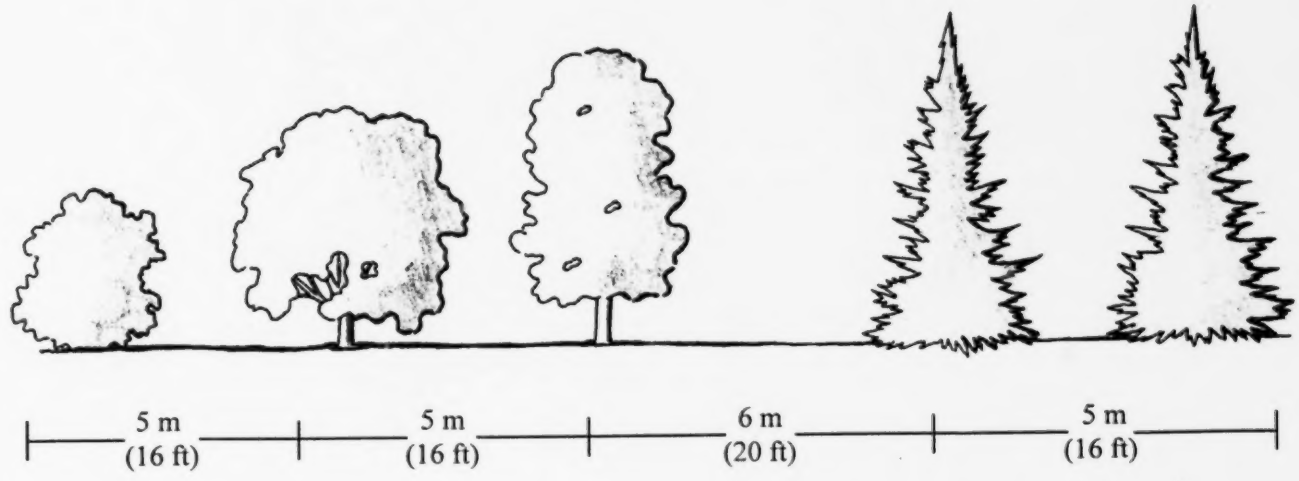
The spacing recommendations within and between rows is very important (Table 2). Remember, you are planting seedlings which will eventually develop into mature trees, reaching heights up to 15 metres (50 ft) and widths up to 10 metres (30 ft). Leave sufficient space between shelterbelt rows to permit the passage of maintenance equipment. Correct spacing between trees and rows allows adequate light, moisture and nutrients for proper growth.

**Table 2**
**Recommended Minimum Spacings Within Rows**

| DECIDUOUS SHRUBS | SPACINGS m | (ft) | DECIDUOUS TREES | SPACINGS m | (ft) | CONIFEROUS TREES | SPACINGS m | (ft) |
|---|---|---|---|---|---|---|---|---|
| Caragana | 0.3 | (1) | Green ash | 2.5 | (8) | Colorado spruce | 3.5 | (12) |
| Villosa lilac | 1.0 | (3) | Manitoba maple | 2.5 | (8) | White spruce | 3.5 | (12) |
| Choke cherry | 1.0 | (3) | Poplars | 2.5 | (8) | Scots pine | 3.5 | (12) |
| Buffaloberry | 1.0 | (3) | Siberian elm | 2.5 | (8) | | | |
| Sea-buckthorn | 1.0 | (3) | Willows | 2.5 | (8) | | | |

### Recommended Minimum Spacing Between Rows

5 m (16 ft) between adjacent deciduous rows
6 m (20 ft) between adjacent deciduous and coniferous rows
5 m (16 ft) between adjacent coniferous rows (Figure 3)




(Figure 3)

When you have selected appropriate tree species and determined the number of rows, draw them on your farmyard plan. Attach a copy of the plan with your application for trees. The Shelterbelt Centre accepts applications on a first come, first served basis starting **JUNE 1 FOR DELIVERY THE FOLLOWING SPRING.**

## Shelterbelt Planning Around Dugouts

A shelterbelt can be designed to trap snow to help replenish water supplies and reduce the hot, dry winds that increase evaporation from dugouts. Trees should be planted at least 15 - 30 metres (50 - 100 ft) from dugouts, depending on drainage. If the land slopes away from the dugout, then plant the shelterbelt closer to allow the trapped melting snow to drain into the dugout. Do not plant any closer than 15 metres (50 ft) to prevent the shelterbelt from using stored water and contaminating the water with foliage.

Multiple rows of shrubs such as caragana, lilac, choke cherry, buffaloberry and sea-buckthorn, provide a dense effective snow trap. Conifers like Colorado spruce, white spruce and Scots pine can be used for greater wind protection. Follow shelterbelt spacing recommendations as previously mentioned.

## Points To Consider In Planning

1. Keep all trees at least 100 feet from roads, buildings, etc. Check with your Rural Municipality regarding tree planting regulations next to road allowances.
2. Plant only as many trees as you can care for. More trees are killed by weeds and grass than by any other cause. Refer to the brochure "Weed Control in Shelterbelts."
3. Avoid any openings or access roads in the shelterbelt which will allow the prevailing winds to blow into the yard site.
4. Protect shelterbelts from livestock; fence off the planting if necessary.
5. Include fruit-bearing shrubs such as choke cherry, buffaloberry and sea-buckthorn in the outer row to benefit wildlife.
6. Ensure dead trees are replaced as soon as possible.

**PFRA Shelterbelt Centre**
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